**Final Lesson: S**tem Activity: Designing and Building a solar oven

**Unit: Energy**

**Grade: 4th-5th**

**Length: 1-2 class periods**

**Objective:** SWBAT design and create a solar oven to further understand the pro’s and cons of solar energy.

**Teacher Standard:**

Component 3a: Communication with students

**Student CCLS:**

**4-PS3-4.** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

**Materials:**

* Shoe box
* Pizza box
* Tin foil
* Edible food item
* Writing utensils
* Interactive notebook
* Gluck Stick
* Different colored construction paper
* A stick or dowel
* Clear plastic wrap
* scissors

**Do now:** SWBATanswer comprehension questions on solar energy to help them brainstorm ideas to create their solar ovens.

1. What is solar energy?
2. How is it used in the world today?
3. How can your previous knowledge of solar energy assist you in creating your solar oven today?

**Mini-lesson:** The teacher will explain that today students will work in groups to create and a test a design they made for a solar oven.

* Students will be split up into groups of 4
* Students will review all materials and individually draw and label a design they came up with for a solar oven
* Students will compare each others ideas with their peers in their group

**Guided Practice: SWBAT** choose a design and work collaboratively to build their solar oven.

* Students will compare their designs and choose one they would like to build.
* Students will write down the following in their science notebooks
  + Materials used and amount of each
  + Hypothesis of how they think their design will work
  + Hypothesis of if they think they design will be successful or not and why?
* Students will work together to use their materials to build their solar oven.

**Guided Practice 2:** SWBAT Gallery Walk & Testing their designs outside (weather permitting)

* + While ovens are being tested, students will explain how they created their oven, the materials they used and why, the food they picked to cook, and whether or not it will be successful.
  + The teacher will then begin a discussion regarding the benefits and negatives to using solar energy with the class.
  + Students will also be recording their observations of their experiment periodically every 5 minutes for a total of 20 minutes.

**Individual Practice:** SWBAT reflect on the results of their solar oven experiment to write a written conclusion using details and observations.

- Students will compare their hypothesis to their actual results and use their own words to explain if their oven was successful or not.

**Assessment:** The teacher will use the rubric below to assess each group.

**Rubric:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Criteria** | **0** | **1** | **2** |
| Collaboration | Student did not work collaboratively with others | Students worked, at times, collaboratively with others | Students consistently worked collaboratively with others |
| Model | Students did not complete the model | Students build a model that needed some adjusting | Students build a model that was successful to the task |
| Data | Students collected little to no data | Students collected some data | Students collected all necessary data |
| Written Conclusion | Students do not have a written conclusion | Students have a partial conclusion with some details | Students have a written conclusion with necessary details |

**Differentiation:** the teacher will assist groups that struggle with fine mote skills.